III. REMARKS

1. Claims 1, 6-12 and 17-24 are not unpatentable over Lagerqvist et al. ("Lagerqvist") US 5,502,713 in view of Wood et al. ("Wood") US 6,092,230 under 35 U.S.C. §103(a).

Applicant's invention according to claim 1 recites that it is inferred, from the value of at least one speech parameter in the channel-decoded speech frame, whether the speech frame contains speech that is decodable by means of a speech decoder. This is not disclosed or suggested by Lagerqvist.

Lagerqvist discloses soft error concealment of speech data, where erroneous speech frame data is enhanced. According to Lagerqvist, since the prior art error concealment is a hard action based on a binary decision CRC check, the actions do not reflect the probability of errors in the different parameters. (Col. 2, lines 30-38) (col. 6, lines 48-49) Therefore, Lagerqvist uses interpolation between parameters from previous frames and the present received frame. (col. 2, lines 65-67) For each received frame a quality measure is created. The quality measure can either be a single parameter or a combination of different parameters. To combine different quality parameters (soft information) a neural network can be used. (col. 6, lines 55-67) The soft information or parameters are, besides Viterbi decoder metrics, estimated BER, signal strength, estimated phase error, radio signal level and CRC flags, the DVCC (Digital Verification Color Code) flag, the synchronization error and the estimated fading rate. The following formulation is used for the interpolation:

Pi(0)=IFUNC(Pi(j), q(j), P(0), q(0)),

where

Pi(0) is the interpolated parameter of present frame (j=0),

IFUNC is the interpolation function,

Pi(j) is the previous frame's (j=-1,-2,...) parameters,

q(j) is the quality measures for the previous frames,

P(0) is the received parameter for the present frame (j=0), and

q(0) is the quality measure for the present frame (j=0). (col. 5, lines 6-20)

Figures 4 and 5 of Lagerqvist illustrate how a state machine is implemented: The normal state (=good frame) is 0. When the received information is considered as bad (CRC is not correct, the soft quality value is lower than a threshold Q1, or the frame consists of FACCH data), the state machine moves to next state. However, if the soft quality value is higher than Q1 but lower than Q3, the incoming frame data is interpolated, but if the soft quality value is higher than Q3, the incoming frame is used. The next states (= bad frame) are states 1 to 7. In states 1, 2, 3, 4 and 5, the received frame parameters are replaced by the previous, good frame's parameters. In states 6 and 7, no speech signal is heard.

This is not the same as inferring from the value of at least one speech parameter whether the speech frame contains speech that is decodable by means of a speech decoder, as is recited by Applicant in the claims.

Rather, Lagerqvist discloses that soft quality parameters (Viterbi decoder metrics, estimated BER, signal strength, estimated phase error, radio signal level and CRC flags, the DVCC (Digital Verification Color Code) flag, the synchronization error and the estimated fading rate) are used for enhancing erroneous speech frame. (Col. 5, lines 1-5), col. 4, lines 30-67)

Lagerqvist does not examine the speech parameters themselves in order to find out whether they really contain speech. For example, Lagerqvist uses the "soft information" obtained subsequent to a first preliminary equalization of the baseband signal. (Col. 4, lines 23-26). In Figures 4 and 5, Lagerqvist only describes how speech parameters (RC, LPC1-LPC10, R0) may be modified (replaced/interpolated/set) based on the soft quality values.

Even if Lagerqvist mentions that the probability of errors in the different parameters needs to be reflected, he does not do this by estimating the probable values of (speech) parameters, as in Applicant's invention. Rather, Lagerqvist utilizes soft quality parameters (mainly dealing with the quality of the received signal). Lagerqvist does not examine the values of the speech parameters directly, only the quality of the speech parameter indirectly through the use of soft quality parameters (of the signal containing the speech parameters). Significantly, Lagerqvist states it is to be noted that the soft information (referenced as s_j) is obtained from the equalizer in the demodulator 12 in FIG. 2 (col. 4, lines 19-26). Therefore, the soft information cannot be equated with the speech parameters, as the speech parameters are only recovered <u>after</u> the deinterleaver 13 and channel decoder 14 of FIG. 2.

Thus, Lagerqvist does not disclose or suggest inferring whether the speech frame contains speech that is decodable by means of a speech decoder, from the value of at least one "speech parameter" in the channel decoded speech frame, as claimed by Applicant.

Woods in combination with Lagerqvist does not overcome the above-noted deficiencies.

Wood discloses bad frame detection in a communication system. Wood describes a way to improve the detection of bad frames, i.e. BFI (Bad Frame Indicator). BFI is detected with CRC (Cyclic Redundancy Check) calculation. In addition to this, channel decoding and re-encoding is also performed. By comparing decoded and re-encoded bits, SER (Symbol Error Rate) is obtained. SER is then compared with a threshold (there can exist multiple bit correction thresholds, i.e. the threshold is dynamic), so that it can be decided whether a BFI bit should be set on. Wood describes as a problem that neither the CRC calculation alone nor in connection with a single threshold is sufficient for BFI determination.

Wood does not recognize the problem addressed by Applicant, nor does it describe the two successive checks of the present application (checking of channel decoding in step 506, and checking whether speech frame contains decodable speech in steps 508 and 510). Wood mainly deals with dynamic bit correction thresholds that improve the performance of the transfer channel.

Wood, in Col. 6, line 61 through Col. 7, line 15, only refers to the situation when there are no speech frames transmitted at all. Such a situation arises during discontinuous transmission (DTX), for example, when there is no speech present to be transmitted. This does not correspond with inferring, from the value of at least one speech parameter in the channel decoded speech frame, whether the speech frame contains speech that is decodable by means of a speech decoder. In Applicant's invention, "decodable by means of a speech decoder" means that if the speech frame is not decodable by means of the speech decoder, even if it has been received error free according to the channel decoding, then it

may not originate from a speech encoder (some errors that the channel coding cannot correct remain in the speech frame, for example). In Wood, channel decoding and speech decoding are done normally, i.e. if the channel decoding in the channel decoder (reference numeral 202) is successful, it is considered that the speech frames contain decodable speech, that may be decoded by the speech decoder (reference numeral 207). Speech frame substitution block (reference numeral 205) takes care of situations when a frame is lost. In Wood, when a bad frame is detected, it refers to a situation where corrupted speech is received from a channel decoder, i.e. this is not a problematic situation, as the bad frame indication already shows that the speech is not decodable by means of the speech decoder.

Thus, in Wood, the speech frame is always considered to be decodable by a speech decoder if the channel decoding indicates that the frame is acceptable. This is not the same as Applicant's invention.

With reference to Lagerqvist, col. 5, lines 1-5, cited by the Examiner, this section of Lagerqvist only states that speech quality is improved by using quality measures other than a CRC flag, used when the CRC flag does not indicate an error and "by making a soft frame masking by interpolation of speech frame data". This section of Lagerqvist simply does not disclose or suggest that the determination of whether the speech frame contains speech is inferred from "the value" of at least one "speech parameter" in the "channel decoded speech frame" as recited by Applicant in the claims.

With reference to Wood, col. 6, line 61 to col. 7, line 15, cited by the Examiner, this section does not disclose or suggest that if the speech frame does not contain speech that would be

decodable by means of a speech decoder, the speech frame is <u>not</u> decoded, as is claimed by Applicant.

What this section of Wood discloses is only that the channel decoder 202 can differentiate when a signal is or is not present. This is not the same as what is recited by Applicant in the claims, and any inference that it is could only be made with hindsight knowledge of Applicant's invention.

Thus, the combination of Lagerqvist and Wood does not disclose or suggest each feature of Applicant's invention as recited in claims 1, 12, 23 and 24. Claims 2-5 and 13-16 should be allowable at least by reason of their respective dependencies.

2. Claims 2-5 and 13-16 are not unpatentable over Lagerqvist in view of Wood and further in view of Dunlop et al. at least by reason of their respective dependencies.

For all of the foregoing reasons, it is respectfully submitted that all of the claims now present in the application are clearly novel and patentable over the prior art of record, and are in proper form for allowance. Accordingly, favorable reconsideration and allowance is respectfully requested. Should any unresolved issues remain, the Examiner is invited to call Applicants' attorney at the telephone number indicated below.

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Respectfully submitted,

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